



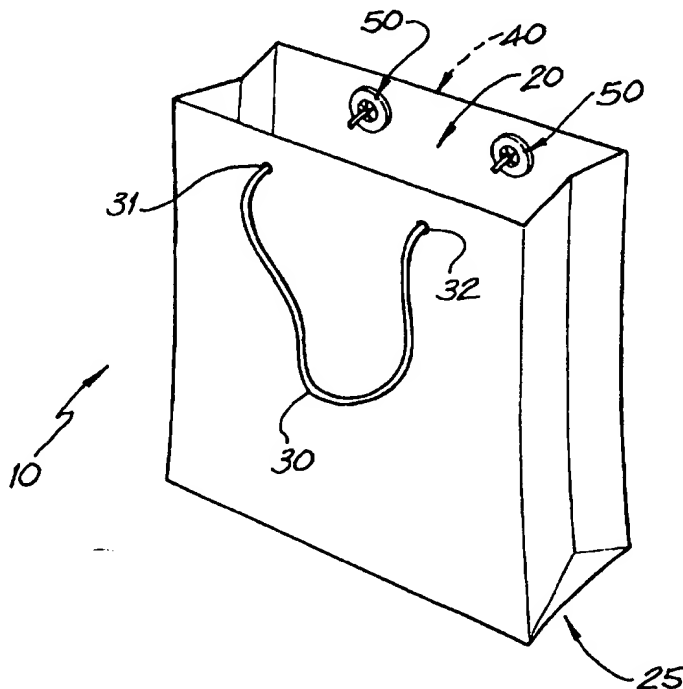
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(54) Title: BAG AND METHOD OF PRODUCTION

(57) Abstract

This invention relates to a method for attaching a flexible cord handle (30 and/or 40) on a bag (10) comprising the steps of: forming a pair of apertures (31 and 32) through a bag wall, providing at least one substantially planar obstruction member (50) with at least one cord receiving passageway therethrough, passing at least one free end of a flexible cord (30) through one of said apertures and into a respective cord receiving passageway of the obstruction member, and fixing the free end of the cord (30) to the obstruction member (50) by deforming at least a portion of the obstruction member surrounding the cord, and further wherein the greatest dimension of the obstruction member is larger than the aperture (31 and 32) in the bag wall.



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"BAG AND METHOD OF PRODUCTION"

Field of the Invention

The present invention relates to bags, methods for providing a handle on a bag, and apparatus for attaching a handle to a bag, in particular, but not
5 only, shopping bags with flexible cord handles.

Background of the Invention

In the fierce field of retail marketing and related services, the use and recognition of brand names is vital. Gone are the days when an assistant would place your purchased items in a plain plastic or brown paper bag.
10 Now most individual boutiques, jewellery shops etc have their own customer bags of various sizes and shapes with the names and logos of the shop or its products printed thereon. Such bags are an effective advertisement for the product or outlet. One particularly popular type of bag has a pair of flexible cord handles which pass through apertures in the bag, the free ends of the
15 handles being tied to prevent disengagement of the handle from the bag. The flexible cord handle is comfortable to use, provides an aesthetically pleasing, high quality product and is easier to pack than rigid handled bags since the flexible cord will drape downwardly on the outside faces of the bag.

Connecting such handles to the bag wall itself, however, creates
20 certain difficulties. Normally the handle is manually passed through the apertures adjacent to the open upper end of the bag and the free ends tied in knots to prevent the handle from disengaging from the bag. This is slow, expensive and labour intensive process, particularly if the handle is produced from a woven cord which has very little rigidity in the axial
25 direction. Further, the possibility of human error cannot be discounted and if the knots are improperly tied, the handle may disengage from the bag altogether leading to damage of the bag contents.

Handles are also known to be fitted to bags via adhesive strips which makes their security dependant on the adhesive and tearability of the strip
30 and/or bag.

It is the intention of the applicant to provide a method and apparatus for attaching flexible cord handles to bags or other receptacles which offers a useful alternative to known arrangements.

Disclosure of the Invention

35 In a first aspect, the present invention provides a method for attaching a flexible cord handle on a bag comprising the steps of;

forming a pair of apertures through a bag wall,
providing at least one substantially planar obstruction member with
at least one cord receiving passageway therethrough,

5 passing at least one free end of a flexible cord through one of said
apertures and into a respective cord receiving passageway of the obstruction
member, and

fixing the free end of the cord to the obstruction member by
deforming at least a portion of the obstruction member surrounding the cord,
and further wherein the greatest dimension of the obstruction
10 member is larger than the aperture in the bag wall.

In a second aspect, the present invention provides a bag made
according to the aforementioned method. Preferably the bag comprises a pair
of flexible cord handles adjacent to an open mouth of the bag.

15 The bag may comprise any suitable flexible material such as paper,
light cardboard, plastic film or fabric.

Preferably, the bag comprises a pair of obstruction members for each
handle, one obstruction member being fixed to each respective free end of
the cord. Alternatively, the bag may include a single obstruction member for
each flexible cord handle, such an obstruction member having a pair of cord
20 receiving passageways adapted to be fixed to both free ends of each flexible
cord handle.

In a third aspect, the present invention provides a substantially
planar obstruction member when used in the method of the first aspect of the
invention, which member is suitable for attachment to a free end of a flexible
25 cord handle, the obstruction member comprising a wall portion with a cord
receiving passageway therethrough adapted to engage and hold the flexible
cord wherein the greatest dimension of the wall portion is substantially
larger than the diameter of the flexible cord.

The obstruction member may be produced from virtually any
30 material such as metal, wood, rubber, plastic, compressed fibres etc. In one
embodiment, the obstruction member is constructed from a resilient material
with the undeformed diameter of the cord receiving passageway being
smaller than the diameter of the flexible cord. This provides an obstruction
member which may be deformed to allow insertion of a flexible cord after
35 which the obstruction member may be relaxed to engage and hold the
flexible cord.

In another embodiment, the obstruction member includes a plurality of inwardly directed prongs, ridges or the like adapted to grip and hold the flexible cord passing through the cord receiving passageway.

Alternatively, the obstruction member may be fixed to the cord by
5 means of an adhesive or by directly moulding the obstruction member onto the cord.

The cord itself may be of any suitable flexible material however woven polyethylene strands are particularly preferred. Such a woven structure provides for better engagement of the prongs.

10 In a fourth aspect, the present invention provides an apparatus for attaching a flexible cord handle to a bag wall, said apparatus comprising a cord supply means for providing a length of flexible cord,

a bag wall supply means for providing a bag wall with a pair of apertures therethrough, and

15 an obstruction member supply means for providing at least one substantially planar obstruction member for each length of cord, each obstruction member having at least one cord receiving passageway therethrough adapted to receive and hold the cord,

20 said apparatus further comprising a cord insertion means for passing each free end of the length of cord on a first side of said wall through a respective aperture into the cord receiving passageway of a respective obstruction member on an opposite side of the bag wall and fixing each free end to that respective obstruction member.

The obstruction member supply means preferably provides pairs of
25 obstruction members for each flexible cord handle. Alternatively, a single obstruction member may be used for attachment to both free ends of the flexible cord handle. Preferably, in addition to holding the cord and inserting each free end into the cord receiving passageway of the obstruction member, the cord insertion means may include a spreader means adapted to
30 temporarily deform the obstruction member to allow for easy insertion of the cord through the cord receiving passageway.

Preferably, the free end of the cord is doubled back on itself before being inserted into the cord receiving passageway of the obstruction member, so that the free end of the cord and the handle are on the opposite side of the
35 bag wall to the obstruction member.

As a matter of choice the obstruction member can be positioned on the interior or exterior side of the bag wall. If the obstruction member is decorative or includes additional advertising material, it may be desirable to have it positioned on an exterior side of bag.

5 **Brief Description of the Drawings**

So that the present invention may be more clearly understood it will now be described, by way of example only with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a conventional bag/receptacle;
10 Figure 2 is a perspective view of a bag according to the present invention.

Figures 3(a), 3(b) and 3(c) are front and rear elevational views and a cross-sectional view respectively, of the obstruction member according to a first embodiment of the present invention;

15 Figures 4(a) and 4(b) are side elevational and perspective views respectively of the obstruction member according to another embodiment of the present invention;

Figure 5 is a front elevational view of the obstruction member according to yet another embodiment of the present invention;

20 Figures 6(a) and 6(b) are side and front elevational views respectively of the obstruction member according to still another embodiment of the present invention;

25 Figures 7 and 8 are side elevational and plan views respectively of an apparatus for providing a flexible cord handle on a bag/receptacle according to another embodiment of the present invention;

Figures 9, 10 and 11 are front, top and side elevational views respectively of an apparatus for providing a flexible cord handle on a bag/receptacle according to yet another embodiment of the present invention;

30 Figure 12 is a schematic plan view of an embodiment of apparatus in accord with the present invention;

Figure 13 is a front elevation view of a part of the apparatus of Fig 12;

Figure 14 is a front elevation view of the apparatus of Fig 12 showing parts of the apparatus different from those shown in Fig 13;

35 Figure 15 is a further front elevation view of the apparatus of Fig 12 with various of the components deleted for clarity;

Figure 16 is a similar view to Fig 15 but with some of the components added that are omitted from Fig 15;

Figure 17 is a similar view to Fig 15 but with additional components depicted;

5 Figure 18 is a side elevation view XVIII-XVIII of Fig 12;

Figure 19 is a similar view to Fig 18 but showing different components which were omitted from Fig 18 for clarity;

Figure 20 is a similar view to Fig 18 but showing additional components that have been omitted from Fig 18 for reasons of clarity; and

10 Figure 21 is another side elevation view similar to Fig 18 but with some components omitted for clarity.

Best Mode for Carrying Out the Invention

As shown in Figure 1, a conventional bag 10 is defined by a plurality of walls 15 with an open upper end 20 and a closed lower end 25.

15 Adjacent its upper end are a pair of flexible cord handles 30, 40 on approximately opposite sides of the bag. The flexible cord handles 30, 40 pass through respective pairs of apertures 31, 32 and 41, 42 in the bag walls.

As per conventional practice, the free ends of the handles are tied in knots 35 (not shown) and 45 on the interior side of the bag such that the ends
20 of handles 30, 40 cannot slide through the apertures in the bag wall and the handle disengage from the bag.

As previously discussed, however, this conventional process is labour intensive, expensive and unreliable. The applicant proposes to replace the knots 35 and 45 with at least one substantially planar obstruction member
25 adapted to be fixed to the free ends of the handles 30,40.

An example of such an obstruction member 50 is shown in figures 3(a)-3(c). The obstruction member 50 comprises a wall portion 55 and a cord receiving passageway 60 passing through the obstruction member. The diameter of the cord receiving passageway 60 is sized to receive the flexible
30 cord. The outer diameter of the wall portion is substantially larger than passageway 60 or the diameter of the flexible cord on which it will be placed.

When the free end of a flexible cord is received by and fixed to the obstruction member 50 on one side of a bag wall, the free end of the cord is prevented from passing through the aperture in the bag wall to the opposite
35 side since the obstruction member 50 is too large to pass through the aperture in the bag wall.

The obstruction member 50 may be fixed to the free end of the cord by any appropriate means including adhesive or direct moulding of the obstruction member 50 on the cord. Preferably, however, the internal surface of the cord receiving passageway 60 is adapted to grip or hold the cord without the use of additional means such as adhesive. Most preferably, as shown in figures 3(a)-3(c) the internal surface of the cord receiving passageway 60 may be provided with inwardly directed ridges, prongs 65 or the like to assist in reliable gripping of the flexible cord by the obstruction member 50.

The obstruction member 50 shown in figures 3(a)-3(c) has a single cord receiving passageway 60 and is adapted to be fixed to a single free end of the flexible cord handle 30, 40. Two such obstruction members 50 can be used for each flexible cord handle on a bag. In another embodiment as shown in Figures 4(a) and 4(b), the obstruction member may be provided by a plate or elongated member with a pair of cord receiving passageways therethrough to be fixed to both free ends of the flexible cord handles.

Figures 7 and 8 show an inventive apparatus for providing a flexible cord handle on a bag according to another embodiment of the present invention which is particularly suitable for use with the obstruction member 50 shown in Figures 3(a)-3(c). A device comprises a flexible cord supply section 100, a bag supply section 200 and obstruction member supply section 300.

The cord supply section 100 comprises a pair of mutually opposed claws or clamps 110, 111 which are movable relative to each other. A continuous flexible cord 120 is fed to claw 111 with a small portion of the cord 120 projecting from the end of claw 111 toward claw 110. To provide a length of cord for the bag handle, claw 110 is moved towards claw 111 to grab the exposed end of the cord 120. Claw 111 then releases its grip on the cord 120 and claw 110 moves away from claw 111 back to a predetermined position to thereby measure out the desired length of cord which is intended to form the bag handle. As discussed above, cord 120 may be made from virtually any flexible material however woven polyethylene strands are particularly suitable.

With the desired length of the cord 120 suspended between claws 111 and 110, a cord insertion means 150 mounted on slidable frame 140 is moved

to a position directly below cord 120 suspended between claws 110 and 111. This cord insertion means 150 is substantially U-shaped in cross-section such that it may receive and hold the cord extending between claws 110 and 111. After the cord is received by a insertion means 150, an appropriate cutting
5 means eg hot melt cutter, slicer, guillotine, cuts the desired length of cord between claws 110 and 111 to provide the conveyance means with a discreet length of flexible cord 120, the free ends of which are exposed on either side thereof.

Preferably, as shown in Figure 7, the cord insertion means 150 is
10 substantially "T"-shaped with a main body 155 and a pair of mutually opposed, outwardly directed gripper/spreader arms 160. Each gripper/spreader arm 160 comprises a thin tip portion 165 connected to the main body 155 by diverging walls 170. The tip 165 is sized to allow easy
15 passageway of a respective obstruction members. The diverging walls 170 are adapted to deform the obstruction members or spread apart any prongs, ridges etc in the cord receiving passageway of the obstruction members while the cord is forced through by the gripper/spreader arm 160. Retraction of the
20 gripper/spreader arm 160 then allows these prongs, ridges etc to return to their original inwardly directed configuration to engage the flexible cord.

In the embodiment shown, the bag supply section 200 is directly adjacent the cord supply section 100. This bag supply section 200 provides a bag wall 210 with a pair of apertures 220, 221 therethrough. The apertures are sized to slidably receive the flexible cord 120.

25 The obstruction member supply section 300 is preferably directly below the bag wall 210. In this embodiment, the obstruction member supply section comprises a pair of rotatable carousels which position substantially planar obstruction members 320, 321 directly below the apertures 220, 221 respectively ready to receive the free ends of the flexible cord.

30 The "T"-shaped cord insertion means 150, with its pair of mutually opposed arms 160, is adapted to pass the free ends of the flexible cord through the respective apertures 220 and 221 in the bag wall to engage obstruction members 320, 321 by rotating or toggling back and forth through approximately 180° ie the main body 155 moves 90° either side of its vertical
35 position where the insertion means 150 initially grips the length of flexible cord 120.

Attachment of the obstruction members 320, 321 to the flexible cord occurs as follows;

5 Firstly, the relative position of the cord insertion means 150 to bag wall 210 is adjusted such that the main body 155 of the cord insertion means 150 is positioned symmetrically above and equidistant from both apertures 220, 221. The main body 155 of the cord insertion means, initially in its vertical (12 o'clock) position is then rotated in an anti-clockwise direction through 90° (to the 9 o'clock position) such that the free end of the flexible cord handle 120 held by the tip 165 on the left hand side of the cord insertion means 150, is forced through aperture 220 to engage the obstruction member 320 directly below. Once engaged, the left hand arm 160 of the cord insertion means 150 releases its grip on the flexible cord and the main body 155 rotates through 180° in a clockwise direction (to the 3 o'clock position) until the other free end of the flexible cord held by tip 165 on the right hand side of the insertion means 150 passes through aperture 221 to engage its respective obstruction member 321.

20 The right hand side of the cord insertion means 150 then releases its hold on the cord and the main body 155 of the insertion means rotates through 90° in an anti-clockwise direction to thereby return to its vertical (12 o'clock) cord receiving position. The bag wall with its newly attached flexible cord handle then passes out the apparatus, a new bag wall is supplied and claw 110 moves towards claw 111 to once again measure out the desired length of flexible cord.

25 In the embodiment shown, the obstruction member supply section 300 comprises a pair of rotating carousels to provide a pair of obstruction members for each handle. In another embodiment, a single obstruction member may be provided in the form of a plate or elongated web with a pair of cord receiving passageways therethrough adapted to be fixed to both free ends of the flexible cord.

30 Figures 4(a) and 4(b) show an alternative embodiment of the obstruction member 70. In this embodiment, the obstruction members comprises wall portion 71 and a cord receiving passageway 72 passing therethrough. In this embodiment the cord receiving passageway 72 is provided by a deformable sleeve or collar 73 extending outwardly from one side of the wall portion 71. To attach the obstruction member 70, the cord

35

handle is fed through passageway 72 and the collar/sleeve 73 is permanently deformed or crimped over the cord to thereby grip the cord.

Still a further embodiment shown in Figure 5 in which the obstruction member 80 comprises a wall portion 81 and cord receiving passageway 82 therethrough. In this instance, the wall portion 80 has a sector 83 missing such that the obstruction member 80 may be crimped or swaged around the cord received in passageway 82.

Figures 6(a) and 6(b) show yet a further embodiment of the inventive obstruction member 90. In this embodiment, the obstruction member 90 comprises wall portion 91, cord receiving passageway 92 and locking prongs or tangs 93 extending from one side of the wall portion 91. The locking prongs or tangs 93 are arranged to project radially inward to thereby engage and grip the cord passing through passageway 92. Preferably, the obstruction member 90 is constructed from metal or plastic. The locking prongs 93 are angled relative to one side of the wall portion 91. In this instance, the locking prongs 93 form an angle of approximately 45° with wall portion 91. To attach the obstruction member, the cord is fed from the opposite side of the obstruction member 90 through cord receiving passageway 92 and past the locking prongs 93. The diameter of clearance portion 95 between the locking prongs 93 is smaller than the cord receiving passageway 92 formed in the obstruction member 90. In this way, the locking prongs engage and grip the cord to prevent disengagement of the obstruction member from the free end of the cord. Due to the angle of the locking prongs/tangs 93 to the wall portion 91, any attempt to pull the cord back through cord receiving passageway 92 results in the locking prongs 93 being pulled towards each other thereby increasing the grip on the cord therebetween. If, as is usual, the cord is made from a woven material, the serrated or sharp edges of the locking prongs may embed in the cord. To avoid damage to the cord itself, the angle of the locking prongs 93 relative to the wall portion 91 may be altered.

Figures 9, 10 and 11 show a further embodiment of an inventive apparatus for providing a flexible cord handle on a bag. The device comprises a flexible cord supply section 500, a bag supply section 600 and an obstruction member supply section 700.

The cord supply section 500 comprises a roller 501 having a bulk supply of cord wound thereon, roller brake mechanism 502, cord centering

bell 503, cord feed rollers 504 and mechanical cutting assembly 505. A pair of cord grippers 506 are slidably mounted on rod 509 which in turn can move laterally relative to the machine. These grippers 506 hold the desired length of cord therebetween.

5 Via the bag supply section 600, a bag is supplied to bag carrier 601. A punching assembly 602 provides apertures through the wall of the bag held by carrier assembly 600.

10 The bag and cord are then moved longitudinally toward the obstruction member supply section 700 at the far end of the machine. This section includes an obstruction member supply stack 701 which provides one or more obstruction members for attachment to the free ends of the cord.

15 Gripping members 506 are manipulated so that the cord is passed through the apertures in the bag wall and engaged by obstruction members supplied from obstruction member supply means 701. Once the obstruction members are attached to the free ends of the flexible cord, the completed bag is removed and the process repeated.

 The apparatus embodiment schematically depicted in Figs 12-20 is marked with reference numerals corresponding to like components as shown in the apparatus embodiments of Figs 7 and 8 and 9-11.

20 In this embodiment the apparatus is shown as including a washer dispensing chute assembly 801 which holds a succession of discrete washers or obstruction members 90 of the embodiment of Fig 6. Successive discrete washers 90 are picked up by each of washer pickup and transfer tools 802 mounted on washer pickup and transfer cylinder 803 which functions as a carriage to move pickup and transfer tools 802 beneath washer dispensing chute 801 so that each transfer tool 802 picks up one washer before returning to the position as shown in Fig 14 or 18-20 to be ready to transfer washers 90 to the ends of cord section 120.

30 Cord insertion tool 150 comprises a pair of pins spaced apart and driven by pneumatic cylinder 804 to pass through the side wall of a bag placed on tray 600. Cord inserting tool 150 functions to also punch holes in the side wall of the bag with washer 90 on the opposite side to receive a doubled over end of the cord 120. Washer 90 is retained in magnetic washer locating tool 805 which drives washer 90 down onto the outer surface of the bag held against tray 600 to force locking prongs 93 to crimp on opposite sides of the doubled over end of cord 120.

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While the present inventive method and apparatus has been described in relation to attaching flexible handles to bags, it will be understood by persons skilled in the art that the inventive obstruction member, method and apparatus are equally suitable for other types of receptacles for example buckets, boxes, baskets etc with flexible cord handles.

The obstruction member may include advertising material for example the name of the retail outlet providing the bags to its shoppers or may be shaped in the form of a company logo or symbol. Of course, in such a case it may be beneficial to position the obstruction member on the exterior side of the bag.

CLAIMS:

1. A method for attaching a flexible cord handle on a bag comprising the steps of:
 - forming a pair of apertures through a bag wall,
 - 5 providing at least one substantially planar obstruction member with at least one cord receiving passageway therethrough,
 - passing at least one free end of a flexible cord through one of said apertures and into a respective cord receiving passageway of the obstruction member, and
 - 10 fixing the free end of the cord to the obstruction member by deforming at least a portion of the obstruction member surrounding the cord, and further wherein the greatest dimension of the obstruction member is larger than the aperture in the bag wall.
2. A bag made according to the method of claim 1.
- 15 3. A bag according to claim 2 comprising a pair of flexible cord handles adjacent to an open mouth of the bag.
4. A bag according to either claim 2 or 3 comprising a pair of obstruction members for each handle, each obstruction member being fixed to each respective free end of the cord.
- 20 5. A bag according to either claim 2 or 3 comprising one obstruction member for each handle wherein each flexible cord handle is engaged by a single obstruction member, each obstruction member having a pair of cord receiving passageways adapted to be fixed to both free ends of each flexible cord handle.
- 25 6. A bag according to any one of claims 2 to 5 wherein the obstruction member is positioned on the inside of the bag wall.
7. A bag according to any one of claims 2 to 6 wherein the cord is made of woven polyethylene strands.
8. A bag according to any one of claims 2 to 7 wherein the bag is
- 30 constructed from a flexible material preferably, paper, light cardboard, plastic film or fabric.
9. A substantially planar obstruction member when used in a method for providing a flexible cord handle on a bag according to claim 1, which member is suitable for attachment to a free end of a flexible cord handle, the
- 35 obstruction member comprising a wall portion with a cord receiving passageway therethrough adapted to engage the flexible cord wherein the

greatest dimension of the wall portion is substantially larger than the diameter of the flexible cord.

10. An obstruction member as in claim 9 wherein the obstruction member is produced from metal, wood, rubber, plastic, compressed fibres.

5 11. An obstruction member according to either one of claims 9 or 10 wherein the obstruction member is constructed from a resilient material with the undeformed diameter of the cord receiving passageway being smaller than the diameter of the flexible cord.

10 12. An obstruction member according to any one of claim 9 to 11 wherein the obstruction member includes a plurality of inwardly directed prongs, ridges or the like adapted to grip and hold the flexible cord passing through the cord receiving passageway.

13. An obstruction member according to any one of claims 9 to 12 wherein the obstruction member is fixed to the cord by means of an adhesive
15 or by directly moulding the obstruction member onto the cord.

14. An apparatus for attaching a flexible cord handle to a bag wall, said apparatus comprising a cord supply means for providing a length of flexible cord, a bag wall supply means for providing a bag wall with a pair of apertures therethrough, and, an obstruction member supply means for
20 providing at least one substantially planar obstruction member for each length of cord, each obstruction member having at least one cord receiving passageway therethrough adapted to receive and hold the cord, said apparatus further comprising a cord insertion means for passing each free end of the length of cord on a first side of said wall through a respective
25 aperture in the cord receiving passageway of a respective obstruction member on an opposite side of the bag wall and fixing each free end to that respective obstruction member.

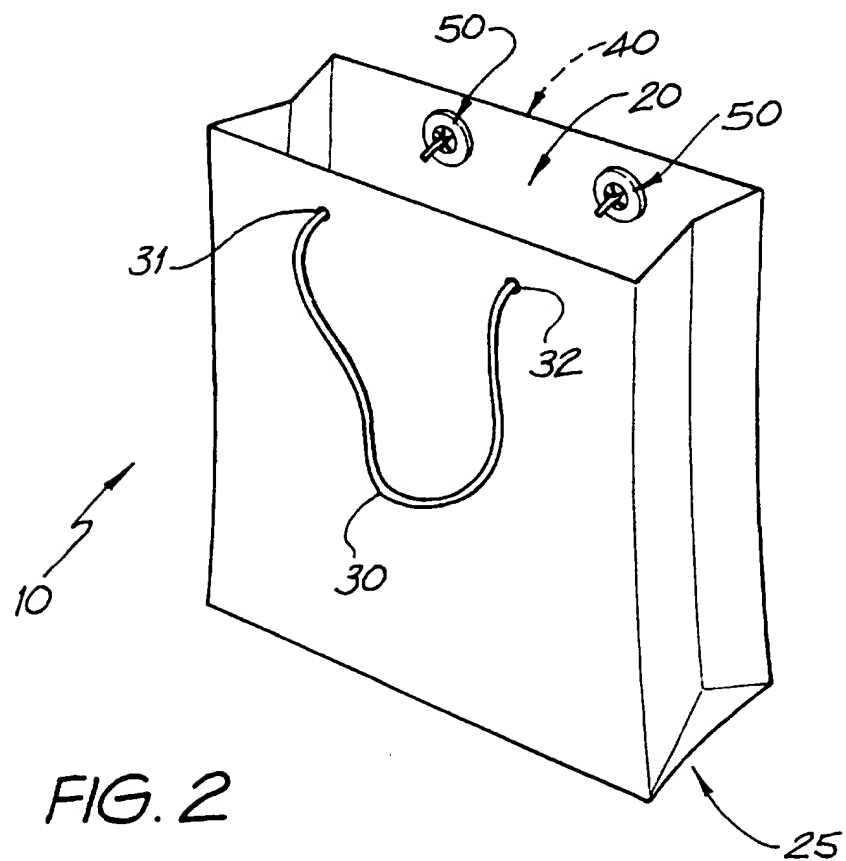
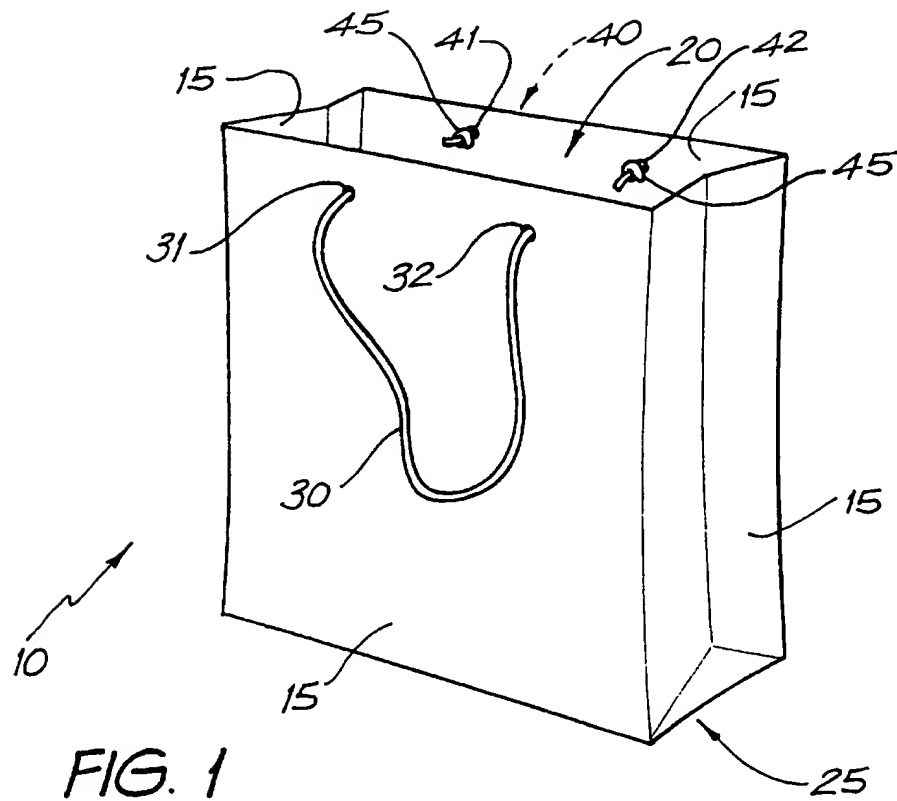
15. An apparatus according to claim 14 wherein the obstruction member supply means provides pairs of obstruction members for each flexible cord
30 handle.

16. An apparatus according to either claim 14 or 15 wherein a single obstruction member may be used for attachment to both free ends of the flexible cord handle.

17. An apparatus according to any one of claims 14 to 16 wherein the
35 cord insertion means includes a spreader means adapted to temporarily

deform the obstruction member to allow for easy insertion of the cord through the cord receiving passageway.

18. An apparatus according to any one of claims 14 to 17 wherein the free end of the flexible cord handle is doubled back on itself before being
- 5 inserted into the cord receiving passageway of the obstruction member.



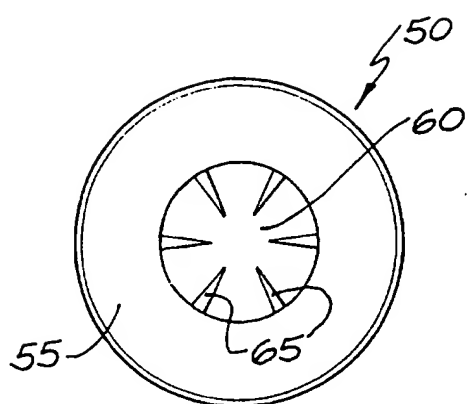


FIG. 3(a)

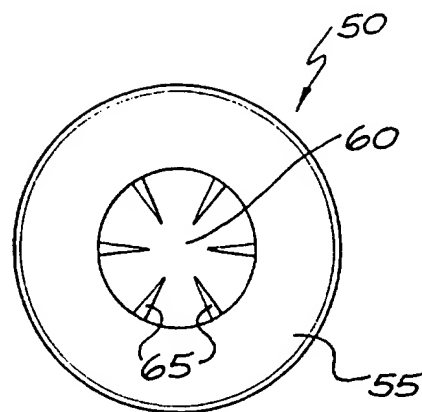


FIG. 3(b)

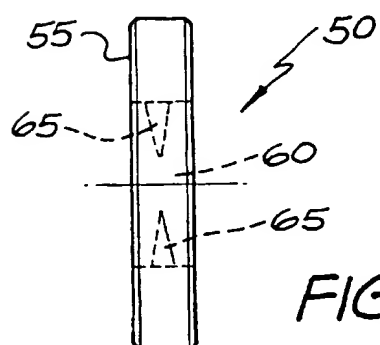


FIG. 3(c)

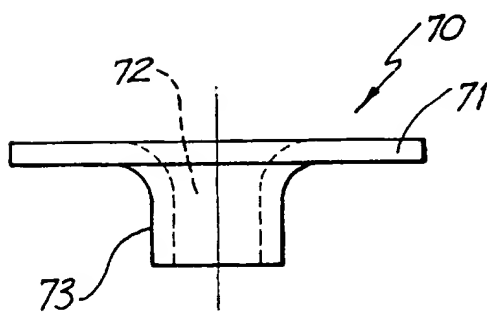


FIG. 4(a)

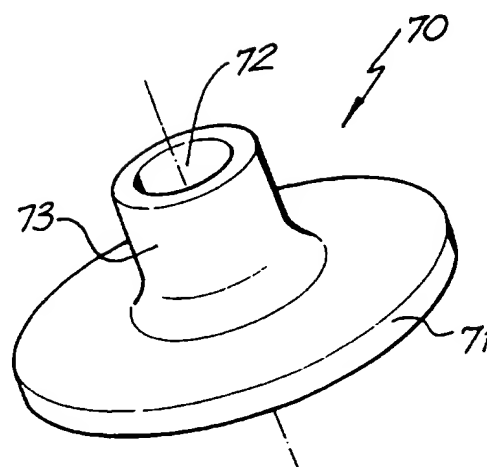


FIG. 4(b)

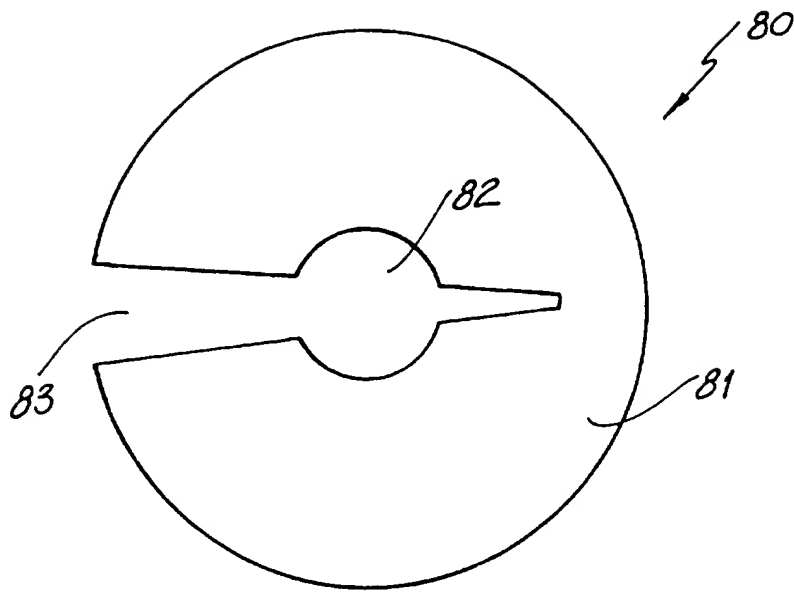


FIG. 5

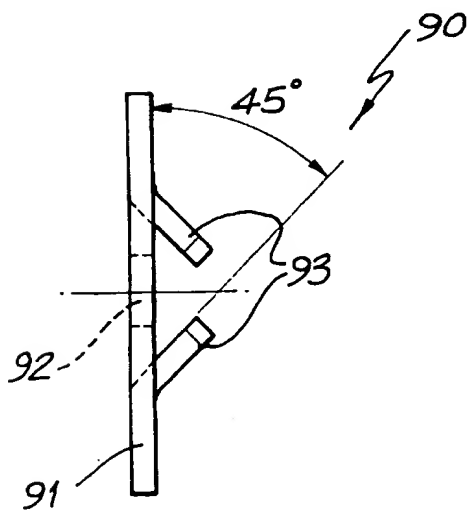


FIG. 6(a)

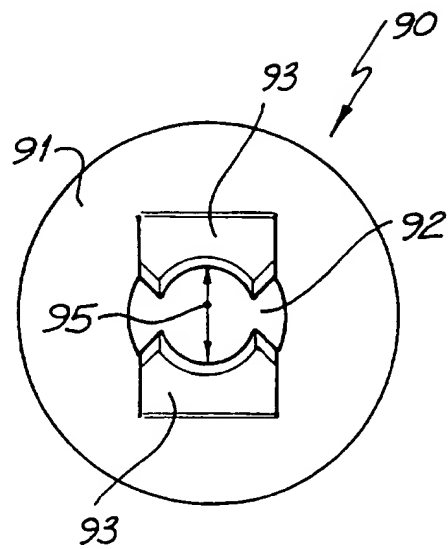


FIG. 6(b)

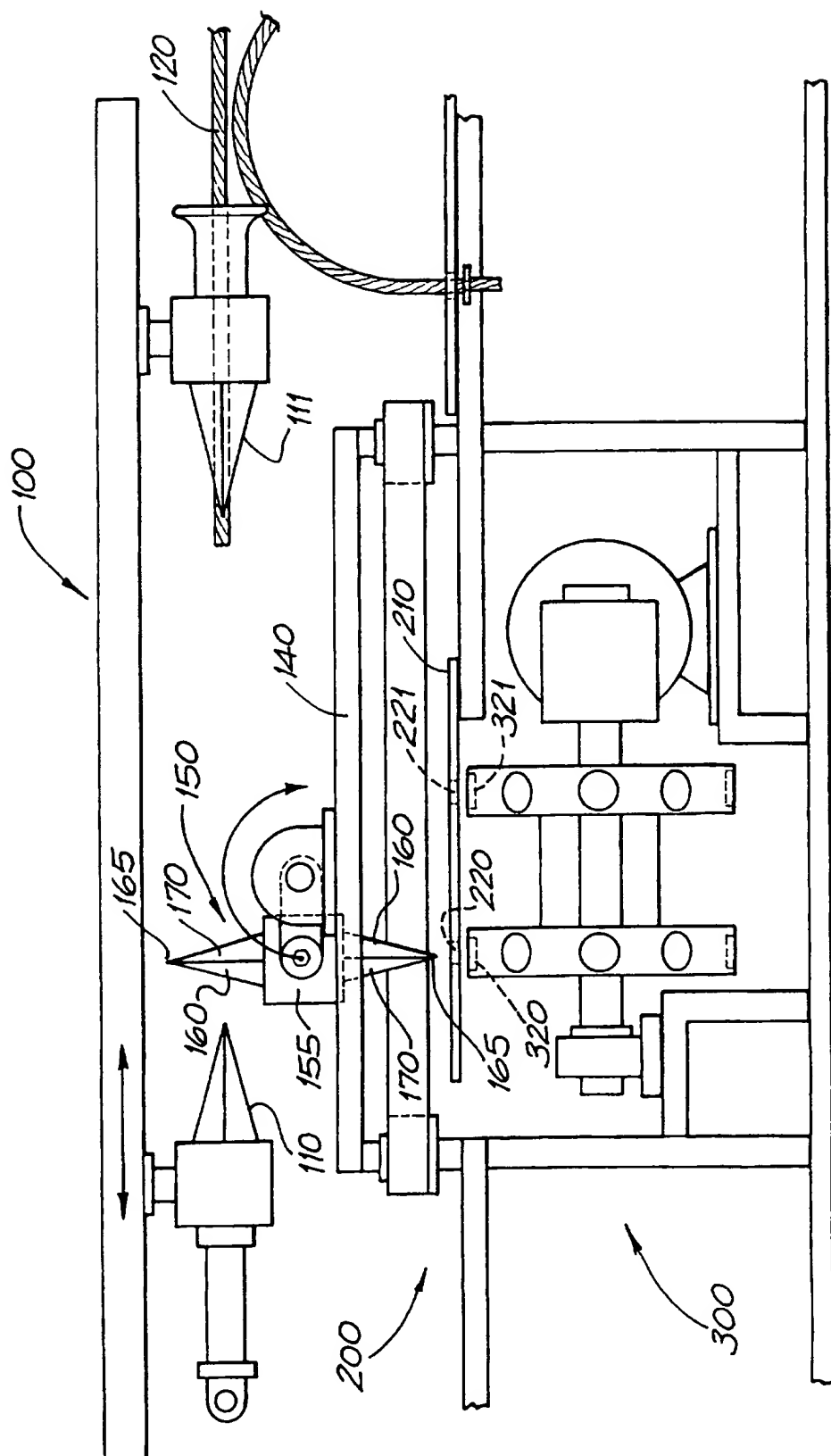


FIG. 7

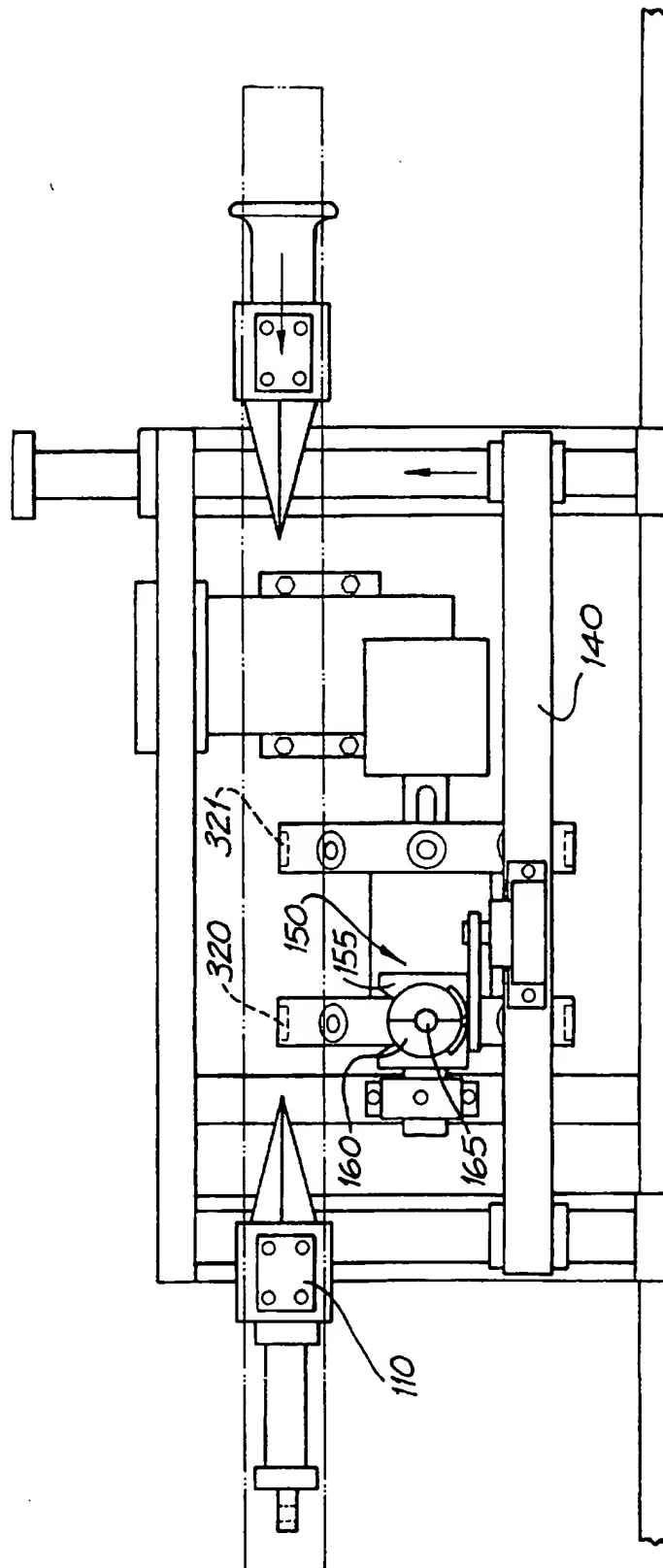


FIG. 8

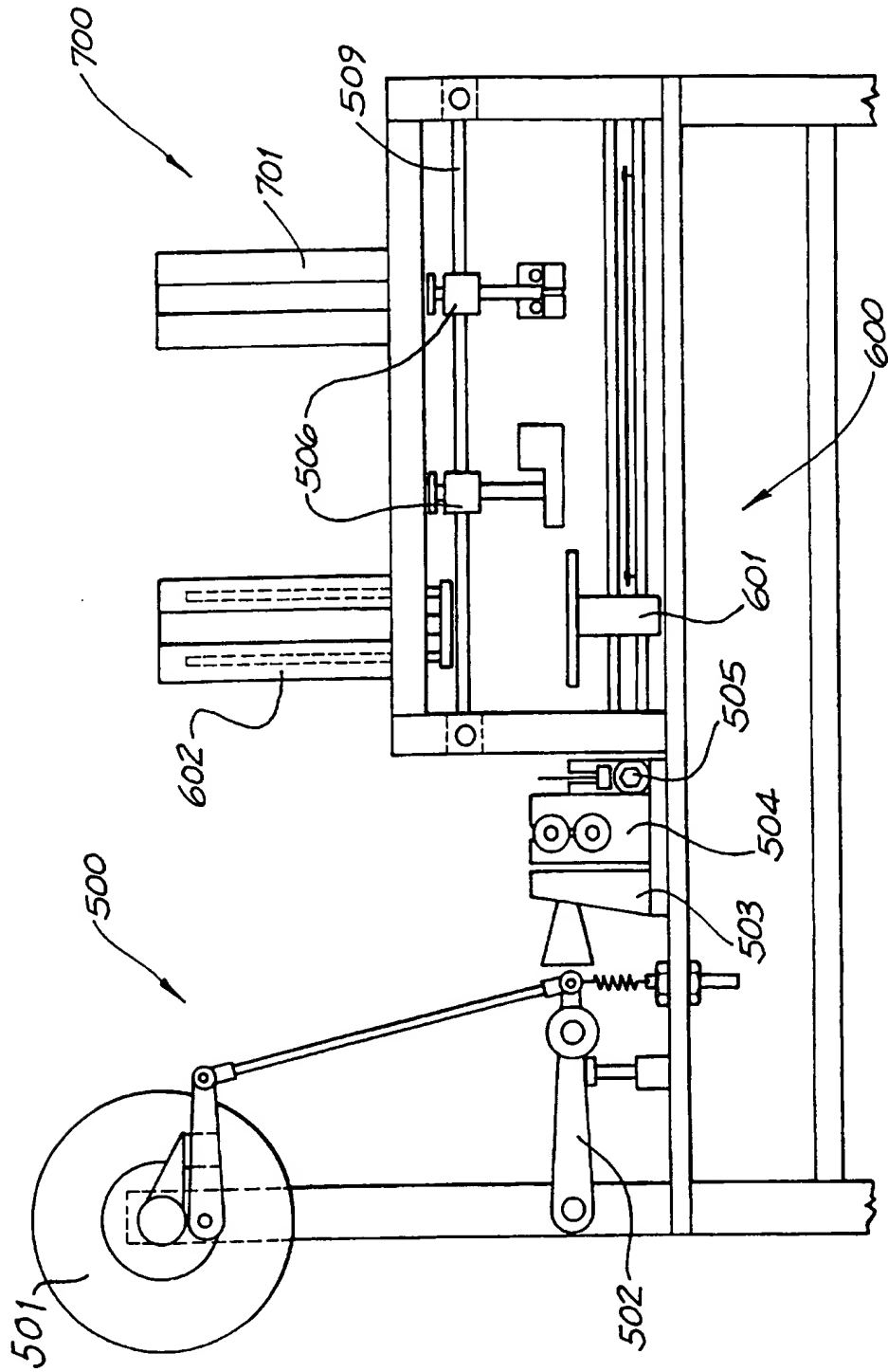


FIG. 9

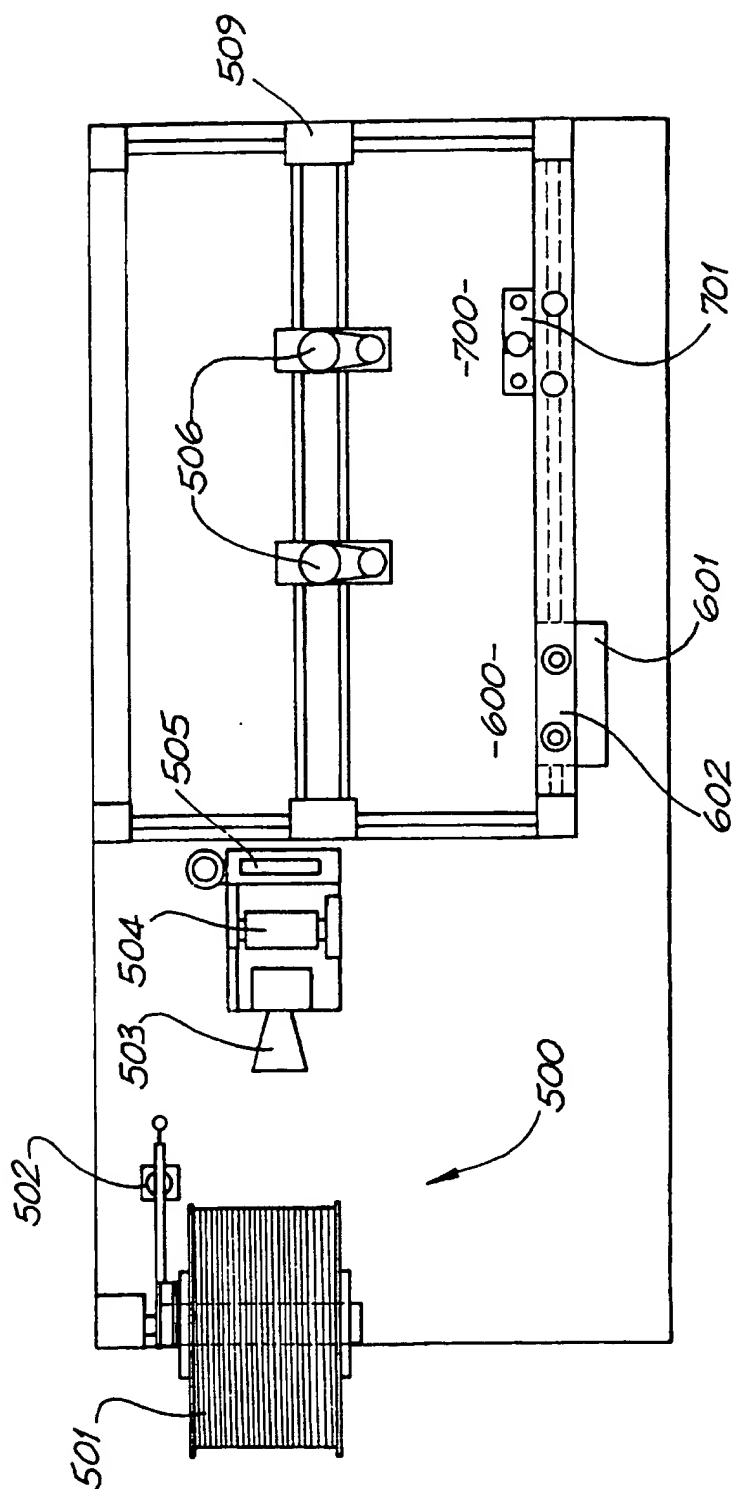


FIG. 10

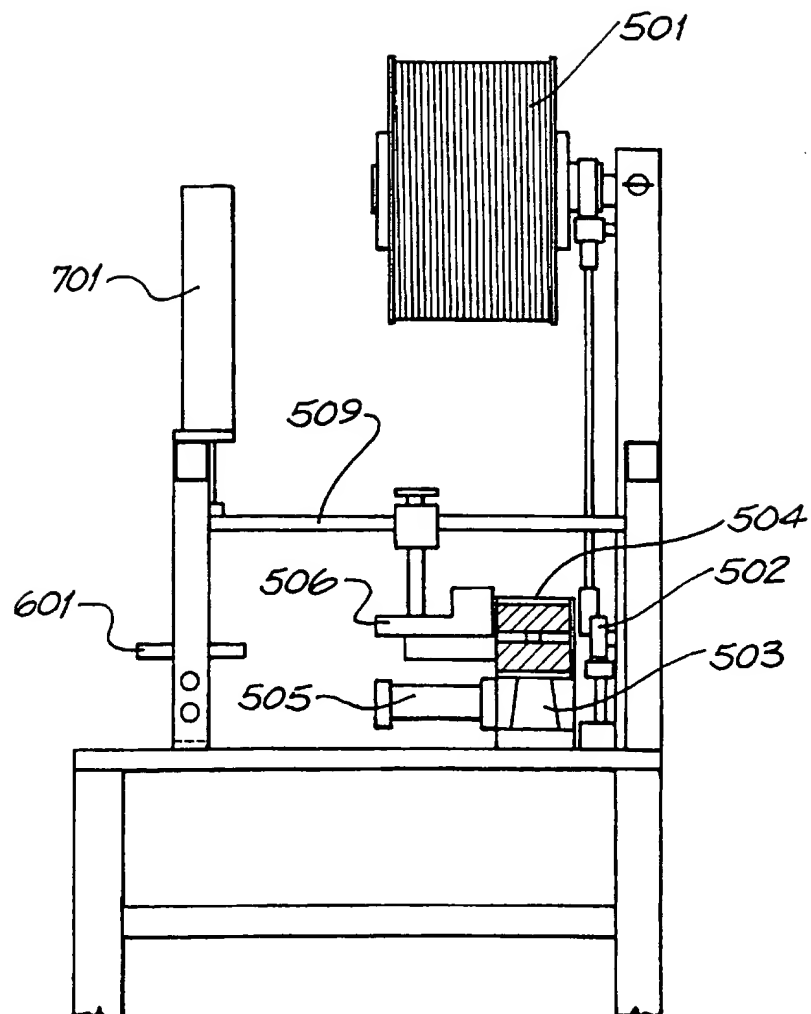


FIG. 11

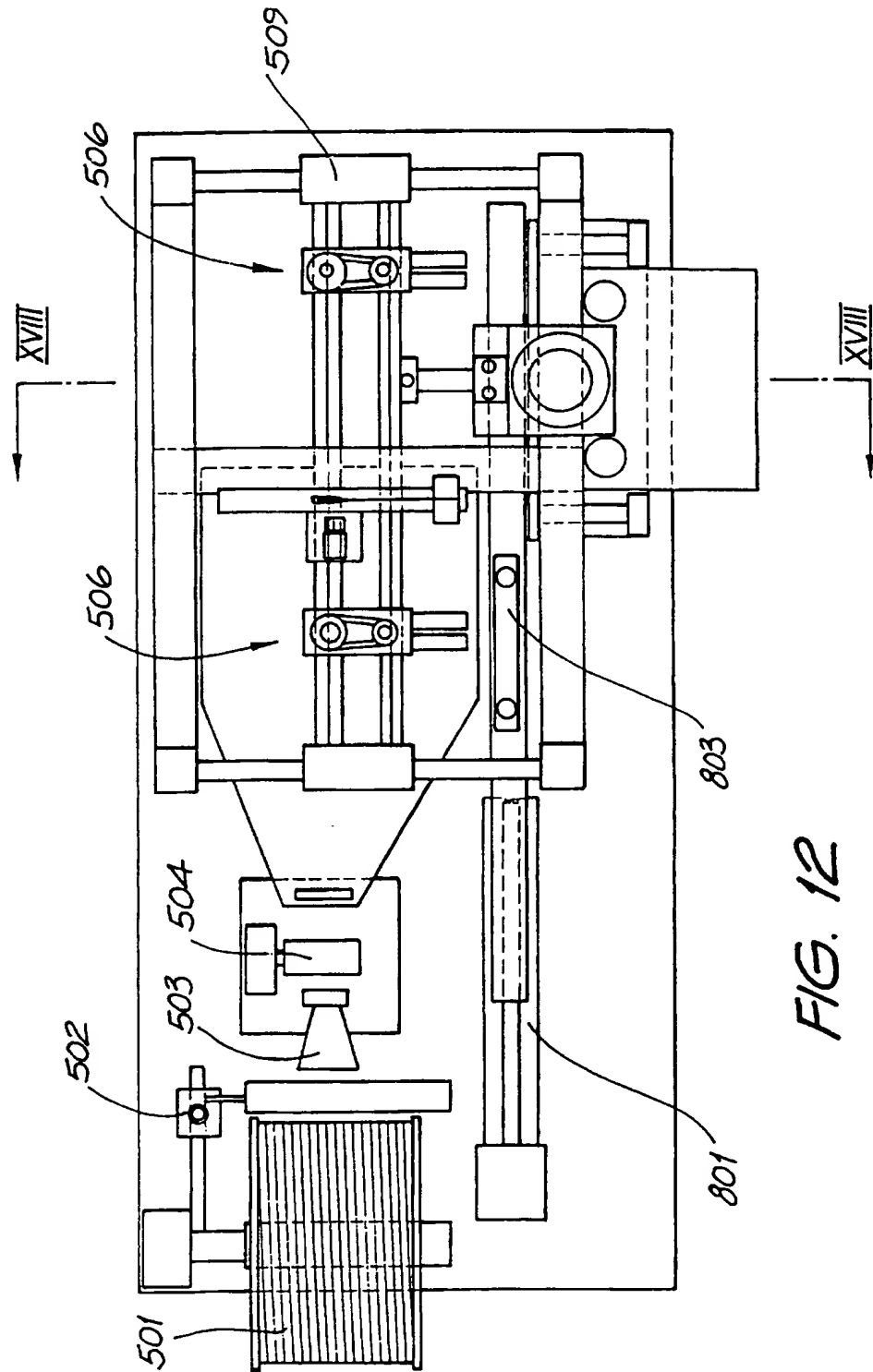


FIG. 12

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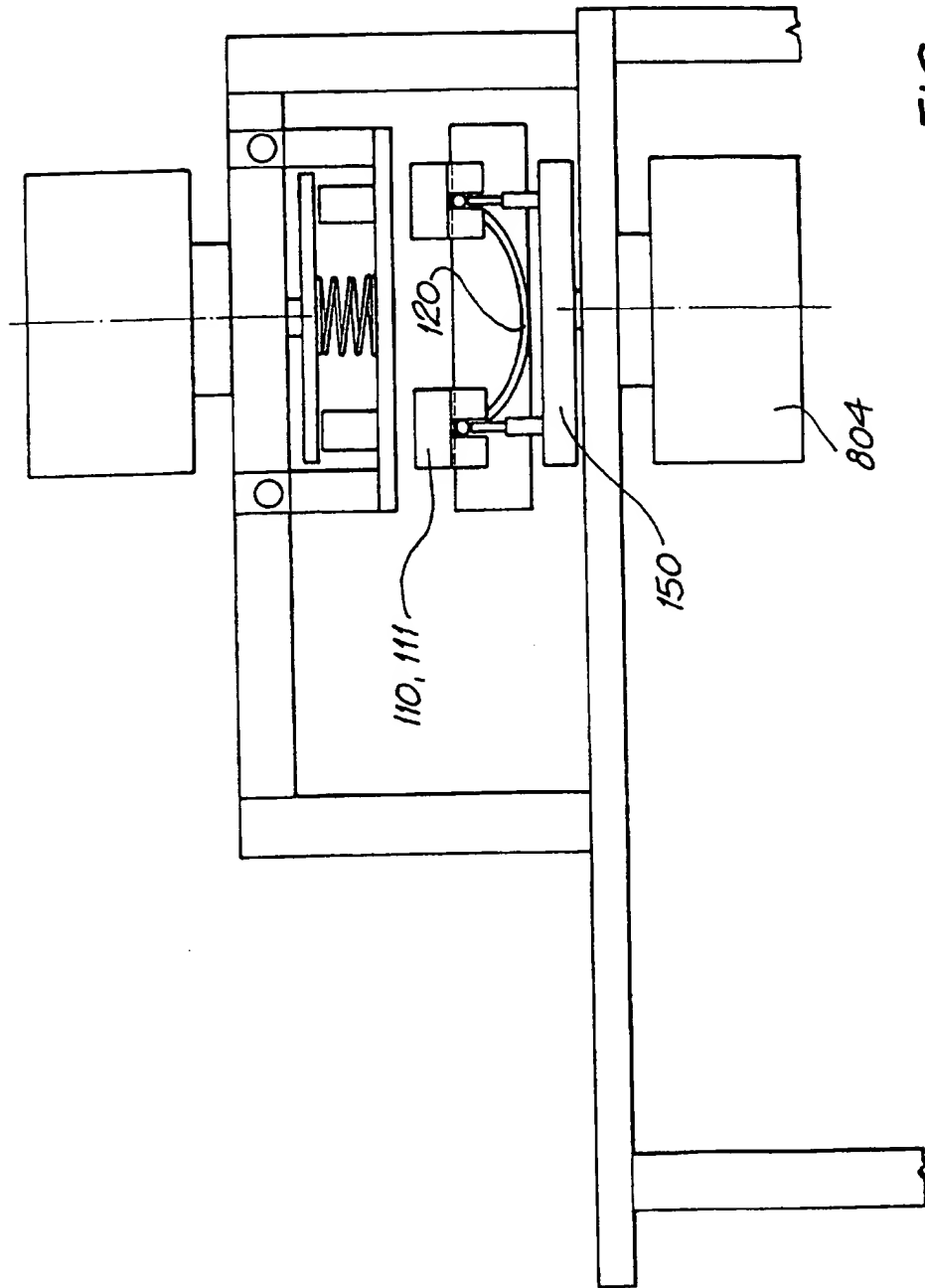


FIG. 13

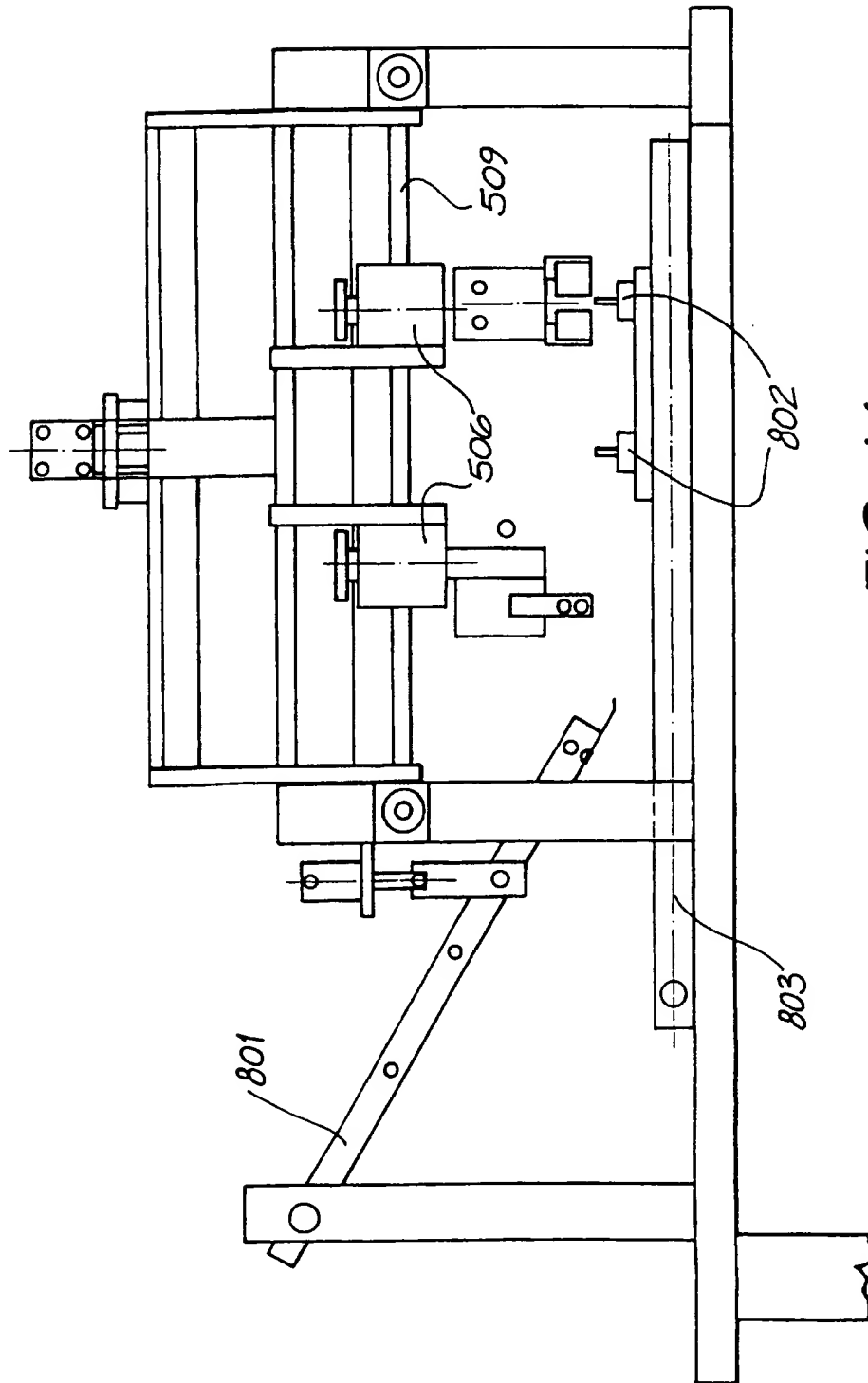


FIG. 14

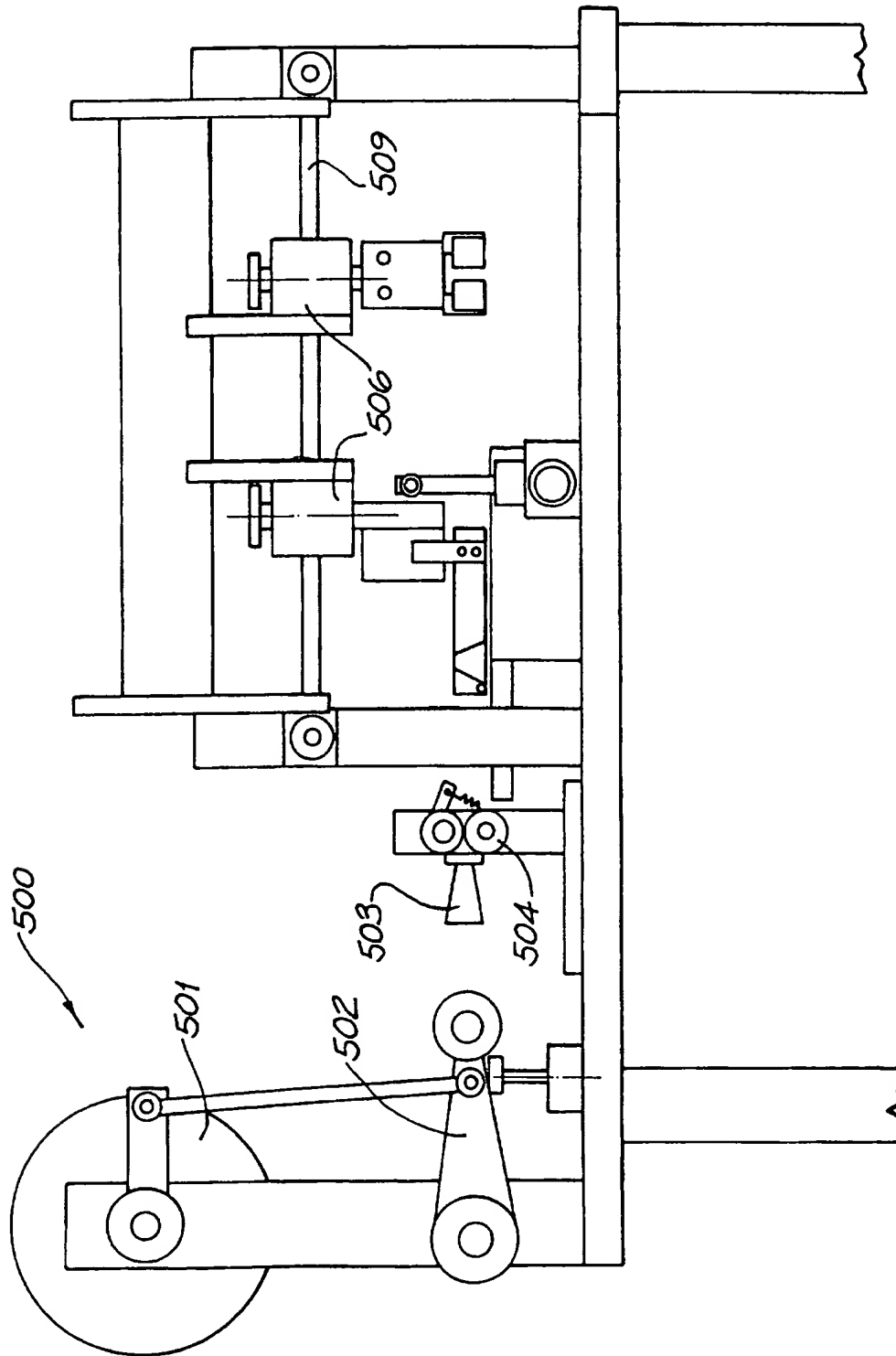


FIG. 15

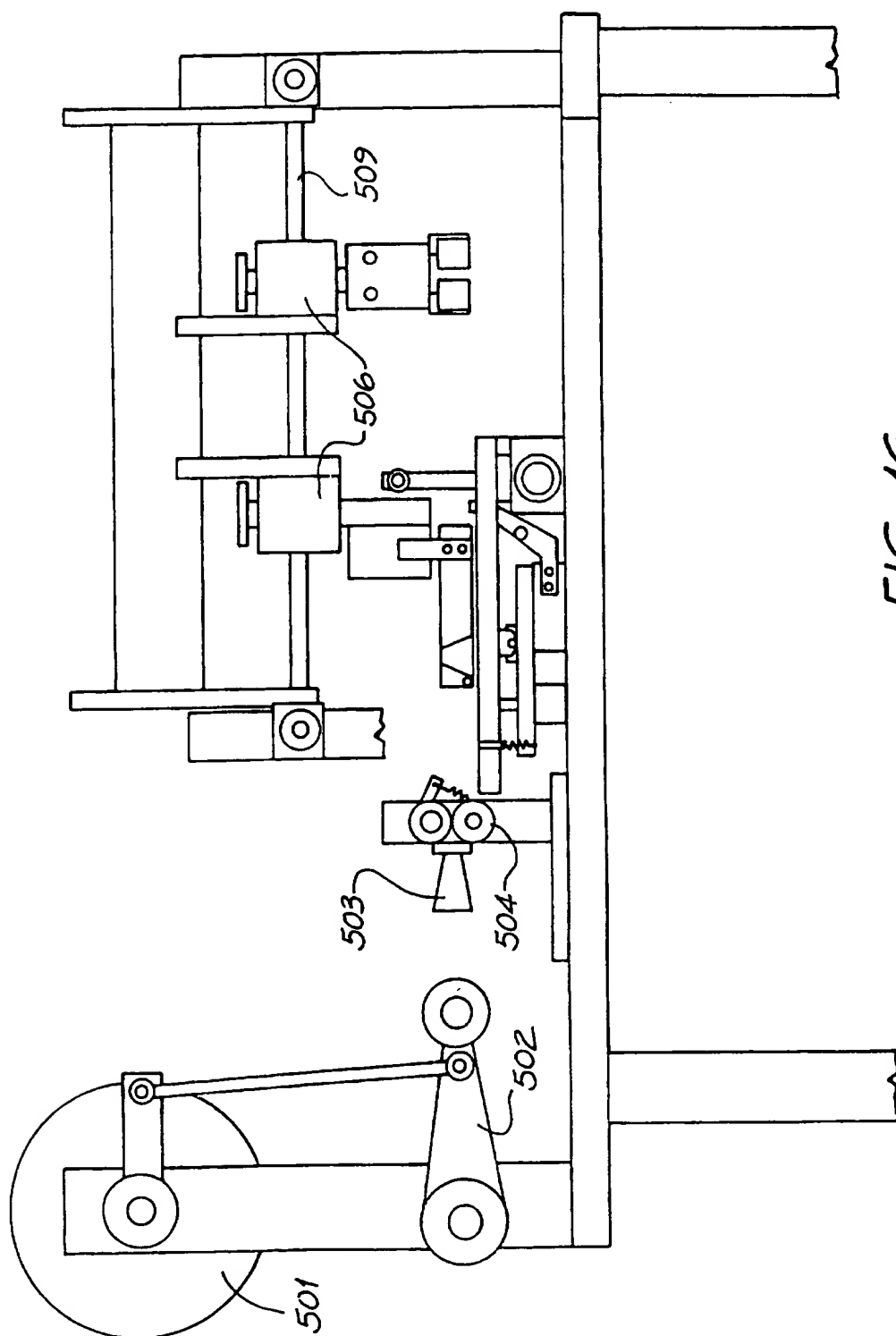
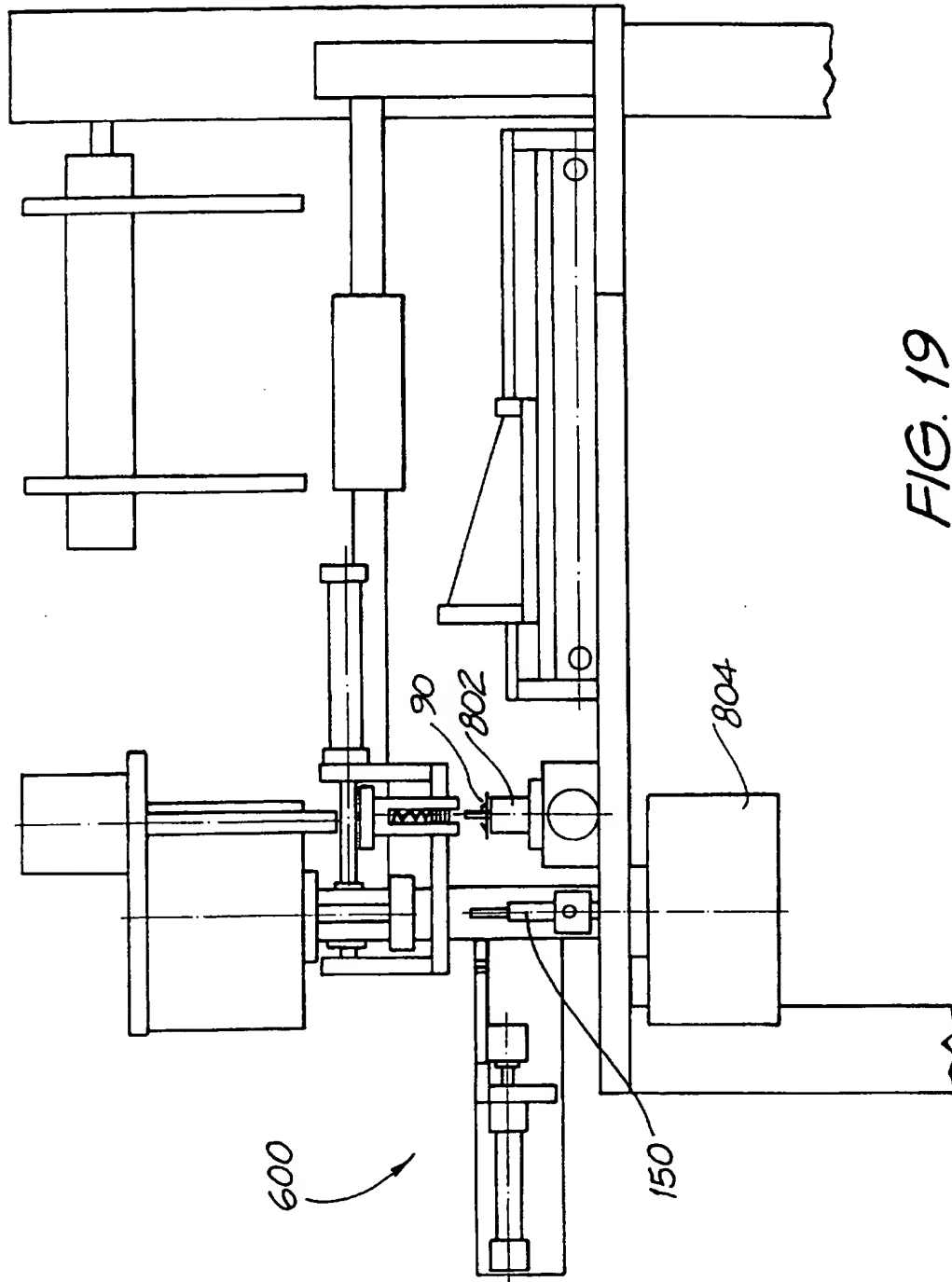


FIG. 16



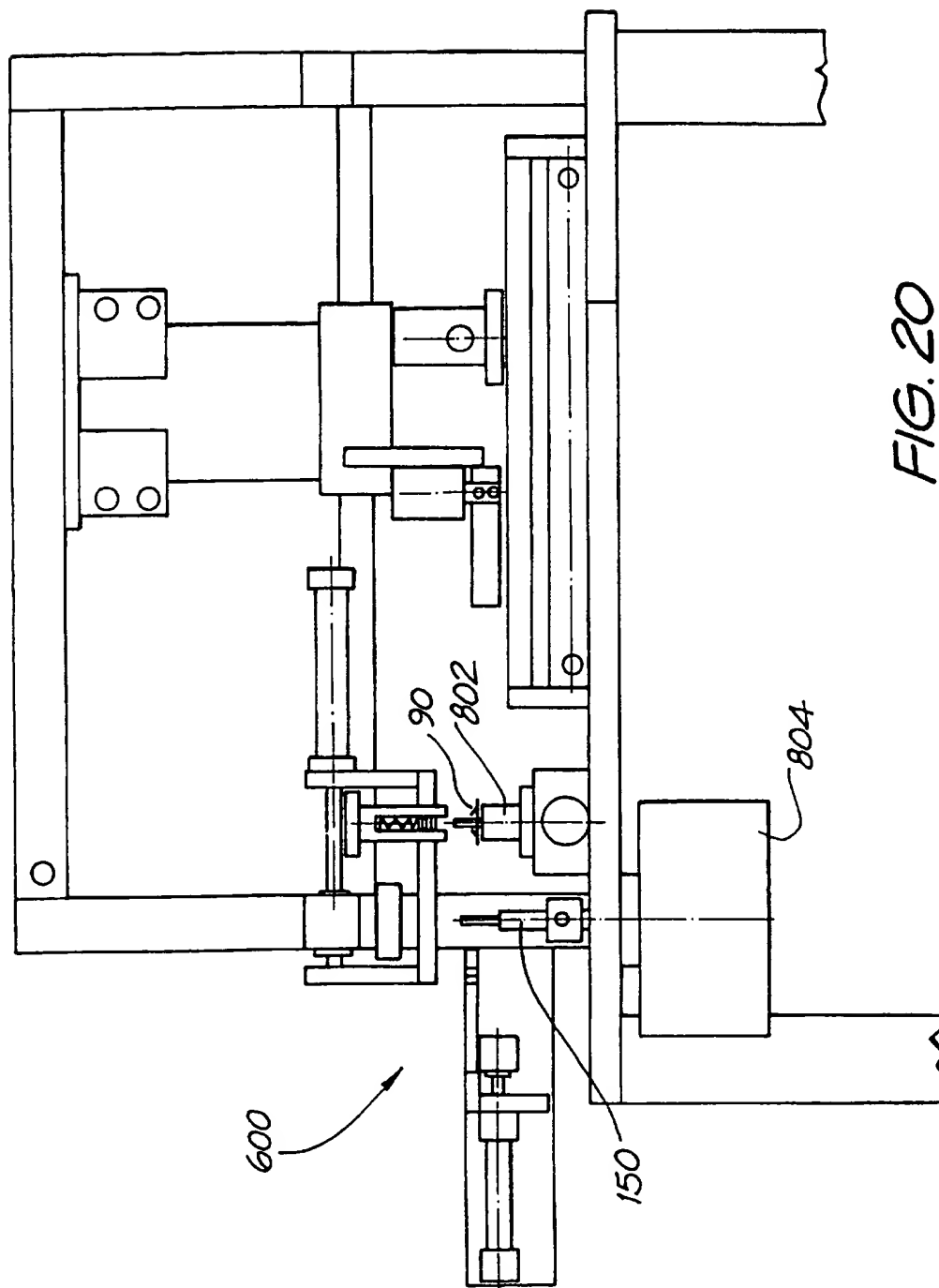


FIG. 20

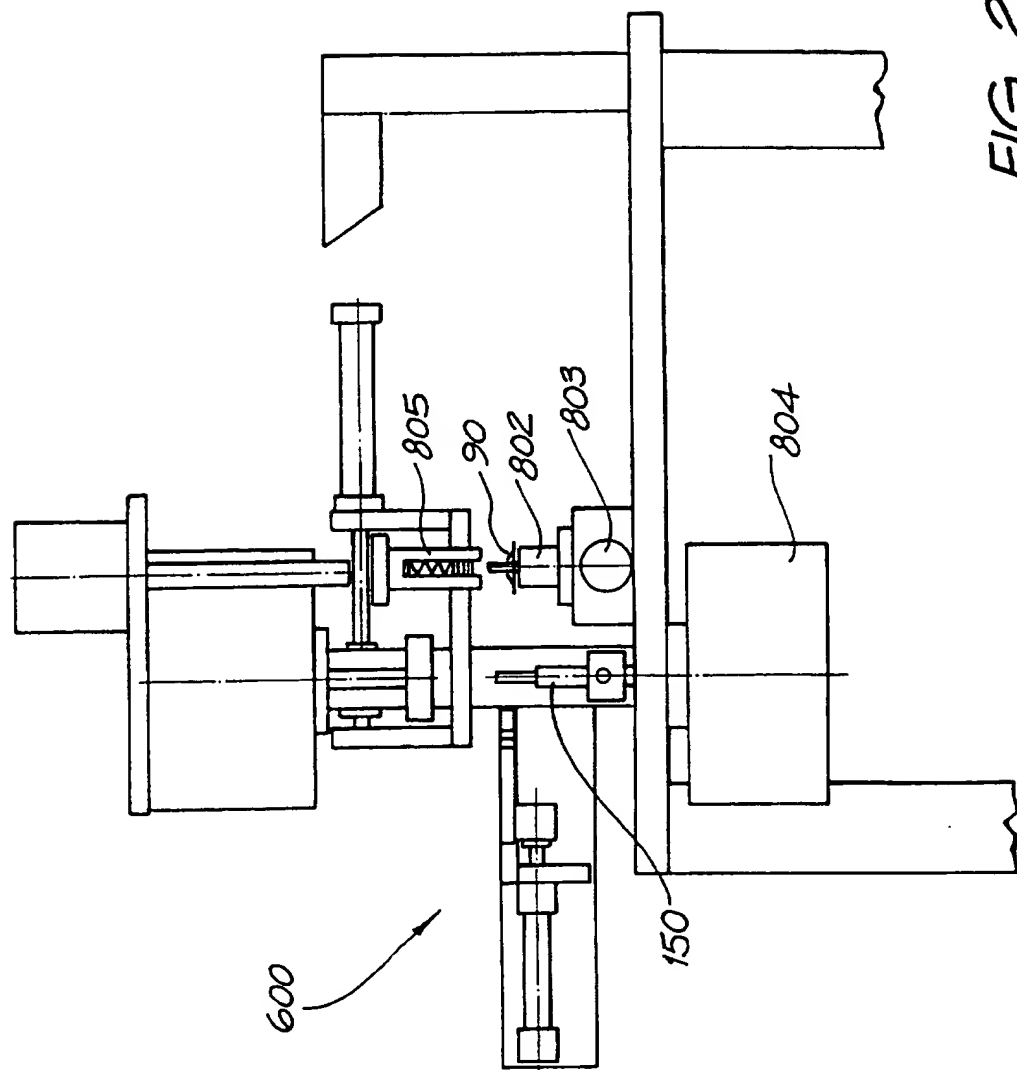
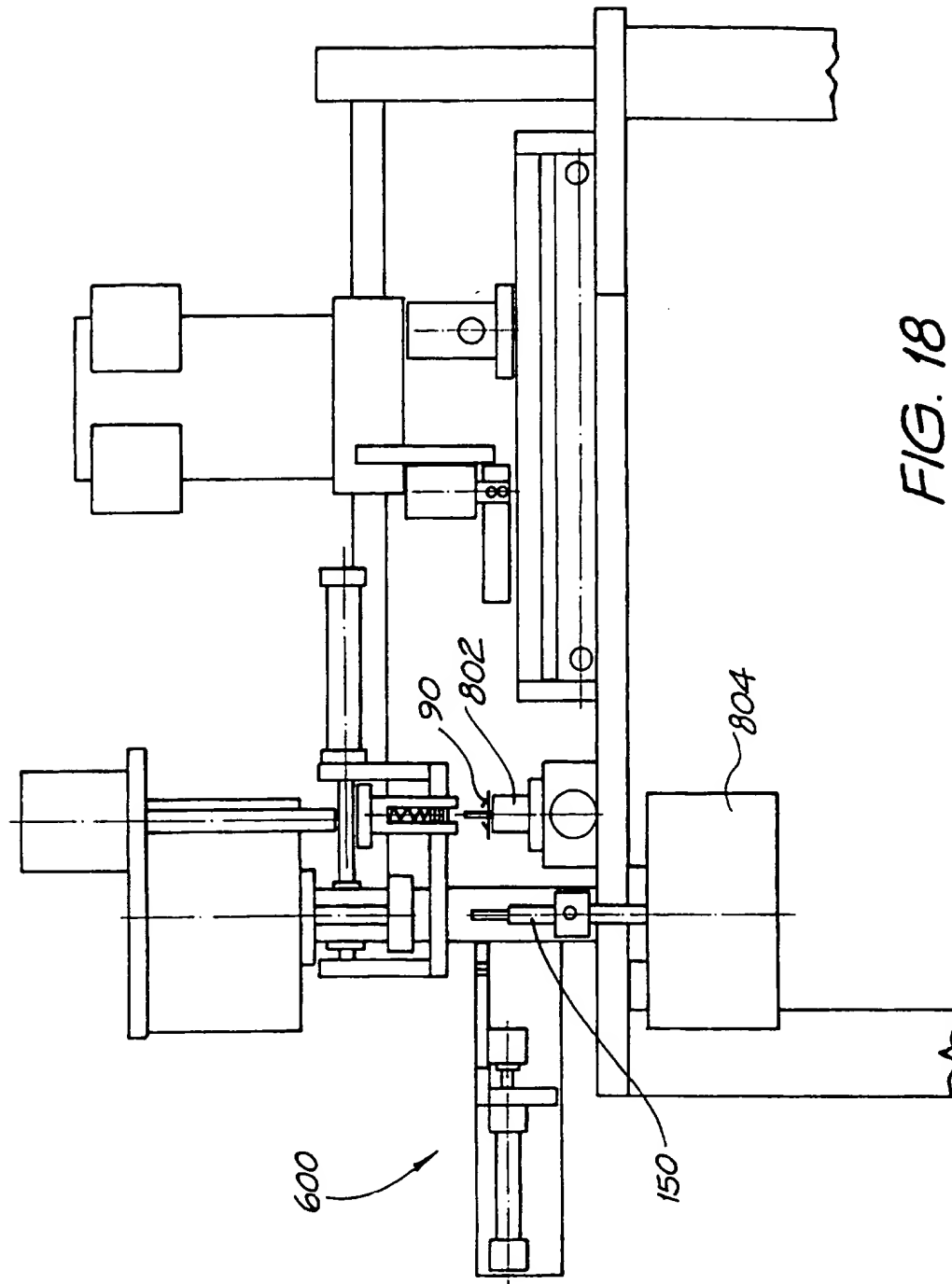


FIG. 21



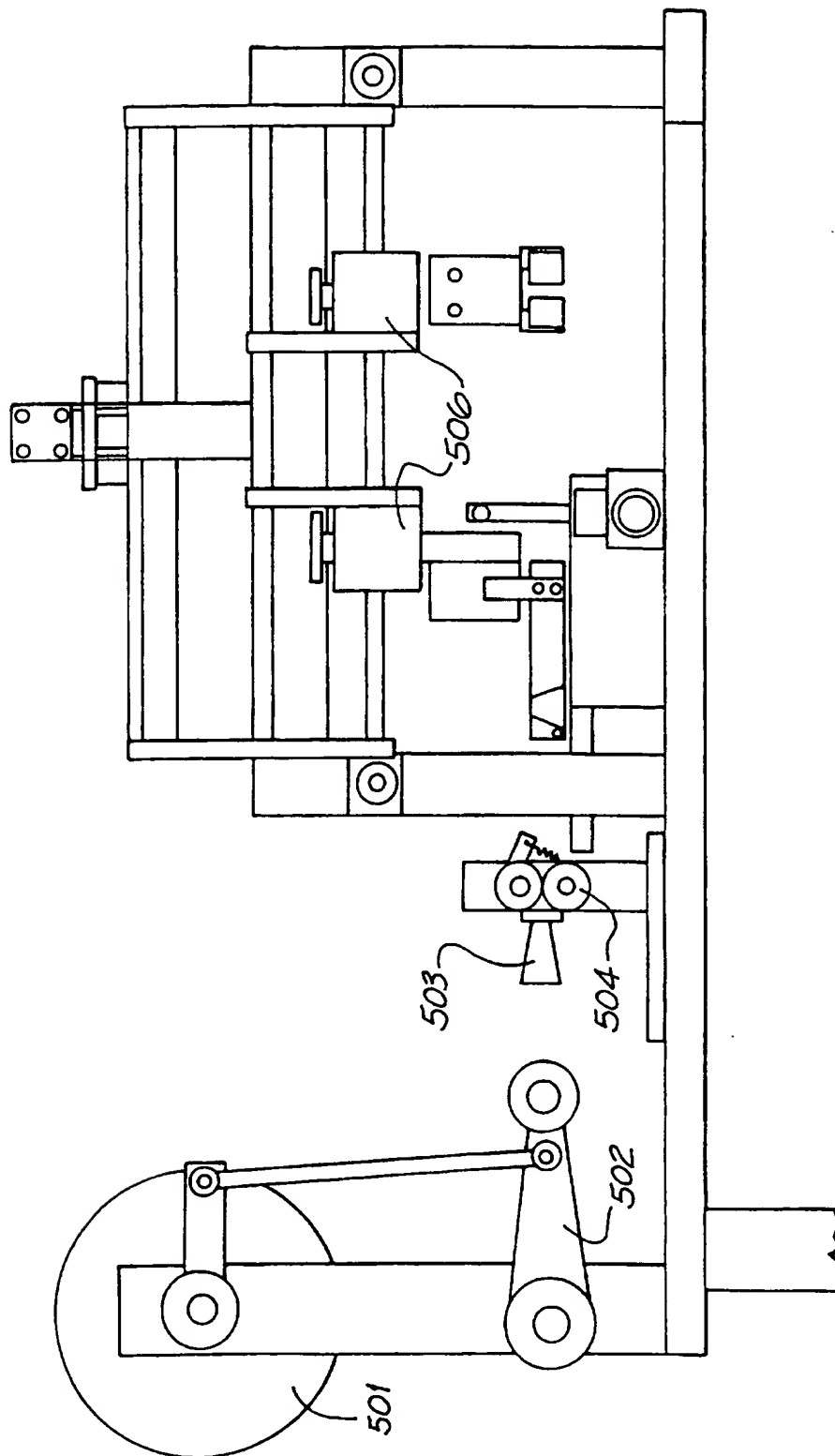


FIG. 17

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 97/00394

A. CLASSIFICATION OF SUBJECT MATTER		
Int Cl ⁶ : B31B 1/86; B65B 61/14		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC: B31B 1/86, 19/74, 19/86, 21/74, 21/86, 23/74, 23/86, 25/74, 25/86, 27/74, 27/86, 29/74, 29/86, 31/74, 31/86, 33/74, 33/86, 35/74, 35/86, 37/74, 37/86, 39/94, 39/86, 41/74, 41/86; B65B 61/14, 61/16, 61/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
DERWENT:		
JAPIO:		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2075672 A (STARK) 30 March 1937 entire document	1-18
A	DE 2132574 A (EQUITABLE BAG CO, INC) 11 January 1973 entire document	1-18
A	DE 4425754 A (REINHART SCHMIT GmbH) 25 January 1996 entire document	1-18
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 3 September 1997		Date of mailing of the international search report 10 SEP 1997
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929		Authorized officer GREG POWELL Telephone No.: (02) 6283 2308

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/AU 97/00394

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 4135962 A (NORD-WEST VERPACKUNGEN GOETZE GmbH & CO) 10 September 1992 entire document	1-18
A	Derwent Abstract Accession No. 95-351508/46, Class F04, AT 9401418, A (INPUT GmbH INNOVATIVE PROD & TECHNOLOGIE) 15 September 1995 see abstract	1-18

International Application No.
PCT/AU 97/00394

Patent Document Cited in Search Report			Patent Family Member			
DE	2132574	NONE				
DE	4425754	NONE				
DE	4135962	WO	9215493	CA	2083499	EP 529041
AT	9401418	AT	400959	EP	693365	